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## PATENT ABSTRACTS OF JAPAN

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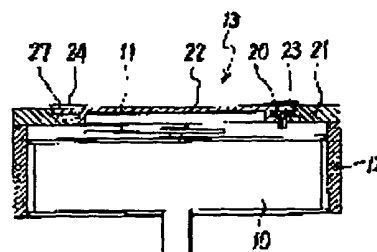
(21)Application number : 09-020104 (71)Applicant : SMC CORP  
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### (54) PRESSURE GAUGE HAVING PRESSURE RANGE INDICATING POINTER

#### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a pressure gauge excellent in the visibility, in which a dial and a pressure range indicating pointer is placed at the position to be easily viewed so that a scale indicated by the indicating pointer can be read out accurately without errors either perpendicularly or obliquely to the front.

**SOLUTION:** A front cover 13 covering the front of a pressure gauge is formed of a second transparent member 22 provided with a pressure scale 24 and a first member 21 holding the second member 22. An indicating pointer 20 = for indicating a usable pressure range is mounted movably in a space formed between both members 21, 22, so that the front cover 13 has both functions of the dial and the indicating pointer mounting member.



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## CLAIMS

[Claim(s)]

[Claim 1] The pressure gage characterized by providing the following. The interior machine which changes and displays fluid pressure on the movement of an indicator. The case where this interior machine is held. The pressure range display needle characterized by what it has the front cover attached in the front face of this case free [ attachment and detachment ], the above-mentioned front cover serves both as the dial plate and the attachment member for display needles, and the display needle which displays the working pressure range of a fluid is attached for possible [ movement ] along with this graduation while the pressure graduation which should be made to direct to the above-mentioned indicator is given to this covering.

[Claim 2] That by which it consists of part II [ where the above-mentioned front cover was held at the part I material and this part I material ] material where it was transparent and the graduation was attached, the crevice which met the above-mentioned graduation among these part I material and part II material is formed in a pressure gage according to claim 1, and the above-mentioned display needle is attached possible [ movement ] in this crevice.

[Claim 3] What covered the above-mentioned display needle from the outside by this part II material by forming the above-mentioned crevice in the position covered by the part II material in a pressure gage according to claim 2.

[Claim 4] What located this graduation outside the display needle in the pressure gage according to claim 3 by giving a graduation for the crevice between the above-mentioned part II material to a wrap portion.

[Claim 5] What was made to perform move operation of a display needle by part for this lobe by making the rear face of the above-mentioned front cover project some display needles in the pressure gage given in any [ a claim 1 or ] of 4 they are.

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## DETAILED DESCRIPTION

### [Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the pressure gage equipped with the display needle which displays the working pressure range of a fluid.

[0002]

[Description of the Prior Art] It is desirable to attach the pressure range display needle which displays the conformity range on the pressure gage which measures the hydrostatic pressure in a hydrostatic-pressure device in order to know whether the measured hydrostatic pressure is in conformity within the limits of the hydrostatic-pressure device. In this case, since the conformity range of a hydrostatic pressure changes with hydrostatic-pressure devices, when attaching the above-mentioned pressure range display needle, it is required that the attaching position can be changed along with a dial plate, that the change work can be done easily, etc. Moreover, a dial plate and a display needle are important also for being in a legible position.

[0003] It has the case 4 where a well-known pressure gage holds the interior machine 1 which changes fluid pressure into the movement of an indicator 2, and is displayed with a dial plate 3 as generally shown in drawing 6, and this interior machine 1, and the transparent front cover 5 attached in the front face of this case 4 free [ attachment and detachment ], and the pressure range display needle 6 is attached in the above-mentioned dial plate 3.

[0004] However, it was in the position where the above-mentioned dial plate 3 retreated a little from the front face of a case 4, since it was moreover brought near and attached in the periphery of a dial plate 3 as the above-mentioned display needle 6 can be prevented from becoming obstructive [ rotation of an indicator 2 ], when a pressure gage was seen from the slanting front, the dial plate 3 and the display needle 6 were interrupted by the case 4, and such a well-known pressure gage had the fault of being very hard to see. Moreover, when changing the position of the display needle 6, in order to have to fit a finger, a tool, etc. over a narrow place and to have to move a small display needle, when the pressure gage was miniaturized, the work was much more difficult [ work was very troublesome, and ]. Furthermore, since the display needle 6 was attached in the superficies of a dial plate 3, with this display needle 6, it was hidden and there was also a problem with many a part of graduations of being hard to see.

[0005] On the other hand, the indicator which attached the display needle free [ movement to the front periphery of a case ] is indicated by U.S. Pat. No. 1,881,389. Since this indicator can reposition a display needle from the outside, the change work is easy.

[0006] However, since a dial plate is in the position which retreated a little from the front face of an indicator like the common pressure gage mentioned above also in this indicator, Since there is a thing hard to see, and the above-mentioned display needle separates this dial plate from the upper surface of a dial plate a little and it is located depending on the angle to see, When an indicator is seen from the slanting front, the physical relationship of a display needle and a graduation shifts, it is not only easy to produce a reading error, but a part of graduation is covered by the display needle, and there is a problem of being hard to see. And since the display needle is outside exposed, there is also a fault of being easy to carry out the position gap of this display needle by contact on a foreign matter carelessly.

[0007]

[Problem(s) to be Solved by the Invention] The main technical technical problems of this invention have a dial plate and a pressure range display needle in a legible position from the outside, and they are to offer the pressure gage excellent in visibility which can read them in any angles certainly. Change of the position of a pressure range display needle is easy for other technical technical problems of this invention, and is to obtain the pressure gage excellent in usability which cannot produce the position gap by contact on a foreign matter easily, either.

[0008]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the pressure gage of this invention The interior machine which changes and displays fluid pressure on the movement of an indicator, and the case where this interior machine is held, While having the front cover attached in the front face of this case free [ attachment and detachment ], and this front cover's serving both as the dial plate and the attachment member for display needles and giving the pressure graduation which should be made to direct to the above-mentioned indicator to this covering It is characterized by attaching the display needle which displays the working pressure range of a fluid possible [ movement ] along with this graduation.

[0009] Since the front cover located in the front face of a case serves as the dial plate and the pressure range display needle is directly attached in this, even if the pressure gage of the above-mentioned composition looks at a pressure gage from what angle, it can read certainly [ it is without error and ] even from the slanting front, and correctly even in a transverse plane the graduation which these dial plates and a display needle hide in a case, and have not said that is hard to see, and a display needle moreover directs.

[0010] According to the concrete composition mode of this invention, it consists of part II [ where the above-mentioned front cover was held at the part I material and this part I material ] material where it was transparent and the graduation was attached, and the crevice which met the above-mentioned graduation among these part I material and part II material is formed, and the above-mentioned display needle is attached possible [ movement ] in this crevice.

[0011] In this case, by forming the above-mentioned crevice in the position covered by the transparent part II material preferably, it is attaching the above-mentioned display needle in the state it having covered from the outside by this part II material, and is locating this graduation outside a display needle more preferably by giving a graduation for the crevice between these part II material to a wrap portion. Thus, by constituting, the problem of a certain foreign matter being able to prevent contacting a display needle, and being able to prevent certainly a position gap of this display needle, omission, dirt, etc., and a part of graduation being covered by the display needle, and being hard to read is also solved.

[0012] In this invention, some above-mentioned display needles project at the rear face of a front cover, and it is constituted again so that move operation of this display needle may be performed through a part for this lobe. Thereby, a front cover can be removed from a case and a display needle can be easily repositioned to this covering side.

[0013]

[Embodiments of the Invention] Drawing 1 and drawing 2 show one example of the pressure gage concerning this invention, and this pressure gage is equipped with the interior machine 10 which changes and displays fluid pressure on the movement of an indicator 11, the case 12 where this interior machine 10 is held, and the front cover 13 attached in the front face of this case 12 free [ attachment and detachment ].

[0014] Although the thing of a well-known Bourdon-tube method which changes into rotation of an indicator 11 deformation of the Bourdon tube (not shown) which deforms by introduction of fluid pressure as the above-mentioned interior machine 10 is used suitably, what is depended on other conversion principles can also be used. Although the point which should be noted about this interior machine 10 is attached in the front face, I hear that the indicator 11 is not attached and it has a dial plate.

... is carrying out the shape of a cross-section square so that drawing 3 may also show, it has circular locus 12a in the center section, is what held the above-mentioned interior machine 10 in this locus 12a, and is constituted by synthetic resin. the stop for the screw mounting hole 16 for inserting in the diagonal section of the couple in this case 12 the screw 15 which fixes a pressure gage to a fluid device etc. being formed, and attaching the above-mentioned front cover 13 in the diagonal section of other couples — the hole 17 is formed

[0016] It was formed in the shape of [ of the almost same size as the cross-section configuration of this case 12 ] a square, and serves both as the dial plate and the attachment member for display needles, and the concrete composition is as follows so that the above-mentioned front cover 13 can be attached in the front face of the above-mentioned case 12 almost exactly.

[0017] So that drawing 4 may also show namely, the above-mentioned front cover 13 The part I material 21 made of synthetic resin which has the circular attaching hole 23 in the center section and which was opaque and carried out the square configuration. It consists of part II material 22 made of the synthetic resin which was transparent and carried out the disk form attached in the attaching hole 23 of this part I material 21. The graduation 24 for a fluid pressure display is given to the periphery portion of this part II material 22, and the required characters 25, such as a numeric value corresponding to the above-mentioned graduation 24, are given to the inner circumference portion of the above-mentioned part I material 21.

[0018] \*\*\*\* 23a of the attaching hole 23 in the above-mentioned part I material 21 The thinning of the upper surface side is carried out over two steps so that it may become so gradually thin that a hole is approached as shown in drawing 5 in detail, and this is received. in the position of the inferior-surface-of-tongue periphery approach of the part II material 22 \*\*\*\* 26 of the cross-section L typeface to which the soffit bent outward is formed annularly. among these \*\*\*\* 23a and \*\*\*\* 26 The crevice 27 for attaching the pressure range display needle 20 is formed so that the graduation 24 given to this periphery portion may be met in the state where it was covered from the outside in the periphery portion of the transparent part II material 22.

[0019] It consists of broad part I part 27a surrounded by the part I material 21 and the part II material 22, and part II part 27b with the narrow width of face which carries out opening to the rear-face side of a front cover 13, head 20a of the above-mentioned display needle 20 which made the shape of a cross section of T characters the above-mentioned part I part 27a is held, and leg 20b is inserting the above-mentioned crevice 27 in part II part 27b. And the nose of cam of this leg 20b can be projected to the rear-face side of a front cover 13, and the display needle 20 can be moved now to arbitrary positions along the above-mentioned crevice 27 by moving a part for the lobe of this leg 20b. In addition, arbitrary meanses, such as adhesion and pressing fit, can perform installation of the part I material 21 to the above-mentioned part II material 22.

[0020] the above-mentioned display needle 20 has elasticity like rubber or synthetic resin, and is formed for a material with comparatively large friction — having — the above-mentioned crevice — in 27, especially, the state where it was compressed a little holds in part I part 27a, and this display needle 20 moves carelessly by the shock, vibration, etc. by this

[0021] moreover — the inferior surface of tongue of the above-mentioned part I material 21 in a front cover 13 — a stop of a case 12 — the position corresponding to a hole 17 — this stop — the hook 28 of the couple which can engage and release a hole 17 freely is formed And when attaching this front cover 13 in a case 12 the position which rotated this front cover 13 a little to the case 12 as the chain line showed to drawing 3 — placing — the position — the above-mentioned hook 28 — a stop, after inserting into double width section 17a of a hole 17 A case 12 is made to rotate this front cover 13 to the clockwise rotation of drawing to the position with which it laps exactly, and when making it make narrow-width section 17b stop hook 28 and removing it from a case 12, it is made to perform operation contrary to this.

[0022] Since the front cover 13 located in the front face of a case 12 serves as the dial plate and the pressure range display needle 20 is directly attached in this, even if the pressure gage which has the above-mentioned composition has a graduation 24 and the legible display needle 20 and looks at a pressure gage from what angle, these graduations 24 and the display needle 20 hide in a case 12, and have not said that it is hard to see. And the graduation 24 which an indicator 11 and the display needle 20 direct can be read even in a transverse plane certainly [ it is without error and ] even from the slanting front, and correctly.

[0023] Moreover, since it is prevented certainly that a human body and other foreign matters contact this display needle 20 by being covered from an outside by the part II material 22 with the above-mentioned transparent display needle 20, an unprepared position gap of this display needle 20, defluxion, dirt, etc. are not generated. Furthermore, since this graduation 24 is located outside the display needle 20 when the display needle 20 of the periphery of the above-mentioned part II material 22 is given to a graduation 24 by the wrap portion, like an old pressure gage, it is covered by the display needle 20 and is not hard to read [ of a part of 24 graduation ].

[0024] Change of the position of the above-mentioned display needle 20 removes a front cover 13 from a case 12, and is performed by moving leg 20b which projects at the rear face of this front cover 13. This work is very easy compared with the conventional method of inserting a finger, a tool, etc. in the narrow portion of the corner of a case 12, and moving the display needle 20 to it.

[0025]

[Effect of the Invention] Thus, since according to this invention the front cover serves as the dial plate and the pressure range display needle is attached in this, a graduation and a display needle are very legible and they can be read in any angles certainly and correctly. Moreover, change of the position of a pressure range display needle is easy, and neither the position gap by contact on a foreign matter, nor defluxion, dirt, etc. arise.

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CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD  
PRIOR ART EFFECT OF THE INVENTION TECHNICAL  
PROBLEM MEANS DESCRIPTION OF DRAWINGS  
DRAWINGS

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the front view showing one example of  
the pressure gage concerning this invention.

[Drawing 2] It is the cross section of drawing 1 .

[Drawing 3] It is the front view of the case in the state  
where the front cover was removed.

[Drawing 4] It is the cross section of a front cover.

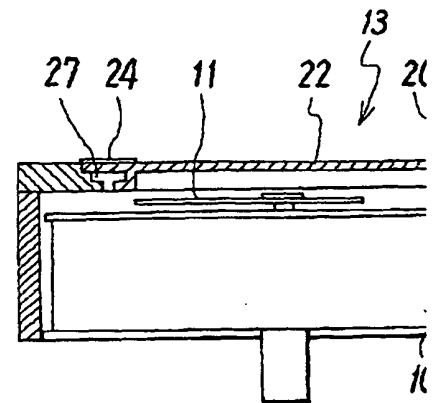
[Drawing 5] It is the important section enlarged view of  
drawing 2 .

[Drawing 6] It is the cross section of the conventional  
example.

[Description of Notations]

- 10 Interior Machine 11 Indicator  
12 Case 13 Front Cover  
20 Display Needle 21 Part I Material  
22 Part II Material 24 Graduation  
27 Crevice

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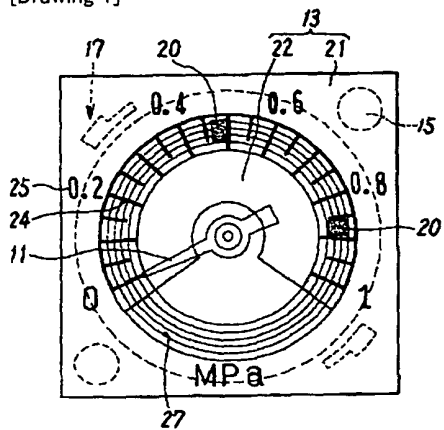
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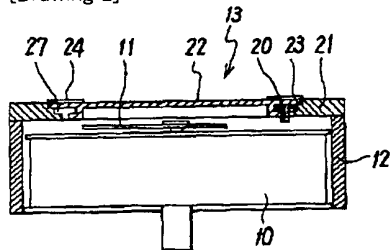
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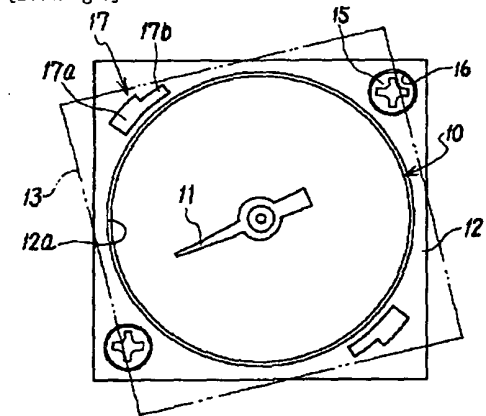
[Drawing 1]



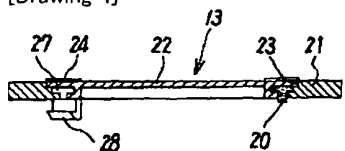
[Drawing 2]



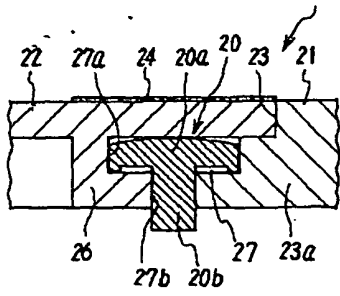
[Drawing 3]



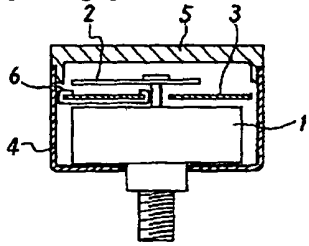
[Drawing 4]



[Drawing 5]



[Drawing 6]



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